Prematurity of 23 or less weeks' gestation is a risk for transient-onset hyperglycemia in neonate.

Take Home Message

"Transient prolonged hyperglycemia in neonates (TPHN)" would be a novel form of hyperglycemia among extremely preterm infants, that requires aggressive therapy, such as insulin.

Transitory hyperglycemia of preterm infants

- Transient hyperglycemia is common among very low birth weight infants (VLBW).
- Occasionally, we experienced atypical transient hyperglycemia that is prolonged and severer than "classical" transient hyperglycemia.

<table>
<thead>
<tr>
<th>&quot;Classical&quot; hyperglycemia</th>
<th>Prolonged hyperglycemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td>Less than 1 week</td>
</tr>
<tr>
<td>Risk</td>
<td>Very low birth weight infants</td>
</tr>
<tr>
<td>BS level</td>
<td>200–300mg/dl (11–16 mmol/l)</td>
</tr>
<tr>
<td>Excess of glucose infusion</td>
<td>Drugs (catecholamine, steroid)</td>
</tr>
<tr>
<td>Hyperactivation of gluconeogenesis</td>
<td>High insulin resistance</td>
</tr>
<tr>
<td>Low insulin secretion</td>
<td>Reduction of glucose infusion rate</td>
</tr>
<tr>
<td>Treatment</td>
<td>insulin</td>
</tr>
</tbody>
</table>

- Insulin

Method

- Study population: Extremely preterm infants (<28 weeks) admitted to a single Neonatal Intensive Care Unit in Japan
- Duration: From Apr. 2015 to Mar. 2018
- Method: Retrospective analysis based on medical records

Aim of this study

Identifying risks and clinical features of prolonged hyperglycemia

Clinical features of prolonged hyperglycemia

Duration: > 6 weeks
- Insulin therapy

Exacerbated after the transition from parenteral to enteral nutrition

At the peak of hyperglycemia

<table>
<thead>
<tr>
<th>&quot;Classical&quot; hyperglycemia</th>
<th>Prolonged hyperglycemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median</td>
<td>Median</td>
</tr>
<tr>
<td>(25–75 %ile)</td>
<td>(25–75 %ile)</td>
</tr>
</tbody>
</table>

- Age (days)
- Blood sugar level (mg/dl)
- Glucose infusion rate (mg/kg/min)
- Enteral feeding (ml/kg/day)

Risks of Prolonged Hyperglycemia

- Risks: Extreme premature (GA<23W), and lower birth weight

Classical hyperglycemia | Prolonged hyperglycemia |
-------------------------|-------------------------|
| Median                  | Median                  |
| (25–75 %ile)            | (25–75 %ile)            |

- Gestational weeks
- Birth weight (g)
- SGA

Cut off value to predict prolonged hyperglycemia: 23w5d

| 23w5d(0.882 0.875) |

A possible hypothesis for TPHN pathophysiology

- Insulin resistance
- Low insulin secretion
- Hyperactivation of gluconeogenesis
- Therapeutic agent dyslipidemia, steroid

TPHN (severer form of neonatal hyperglycemia)

- Possible reasons why few studies reported TPHN to date
- Limited number of viable neonates who were born 23w or less of gestation
- As improving viability of extreme preterm infants (<23w), the number of neonates with TPHN will increase.

More detailed multicenter studies are required

Discussion

- Based on our observation, we propose a novel type of transient neonatal hyperglycemia, "Transient prolonged hyperglycemia in neonates (TPHN)."
- It is characterized by
  1. Persistent more than 6 weeks
  2. Prolonged after the transition from parenteral to enteral nutrition
  3. Requires aggressive treatment, such as insulin infusion.
- Risk factor: Extremely Preterm (23w5d or less)

Reference


Fetal, neonatal endocrinology and metabolism (to include hypoglycemia)
Takeru Yamauchi

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